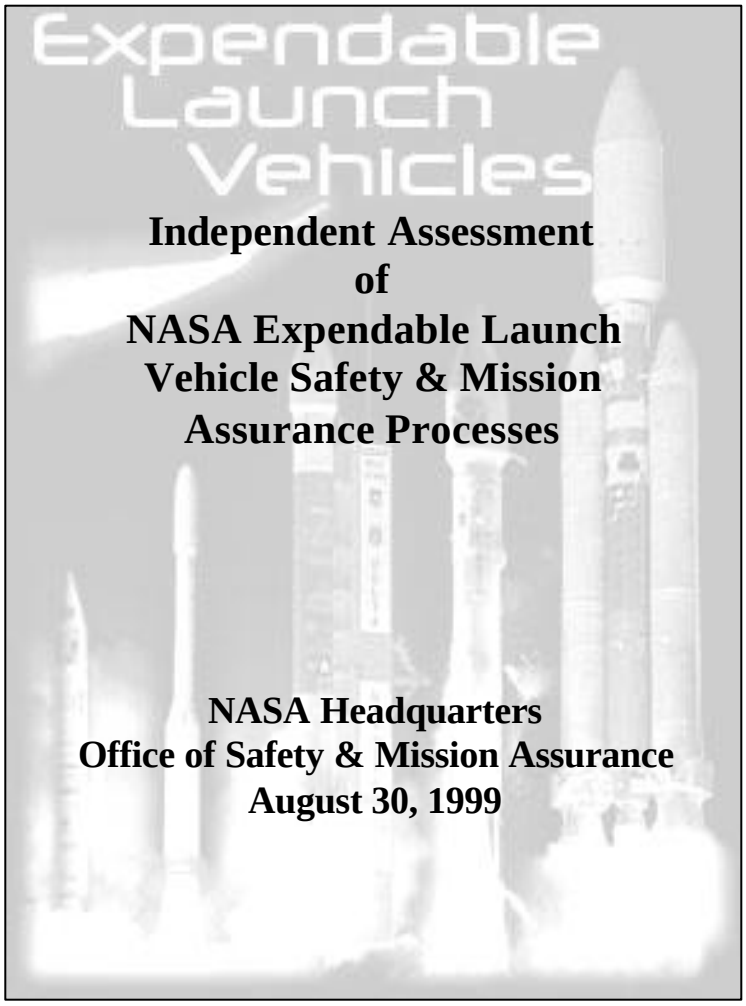
This document contains excerpts from the Expendable Launch Vehicles (ELV) Independent Assessment Report (title page shown below). Only those sections which relate to the PBMA element **Program Management** are displayed.

The complete report is available through the PBMA web site, Program Profile tab.



1.2.3 ELV Management History and Transition

Prior to 1984

Prior to the Commercial Space Launch Act of 1984, NASA was responsible to the Nation for the overall management and operation of the Delta, Atlas Centaur, and Scout ELV's. These programs were primarily accomplished by the contractor under traditional cost plus research and development (R&D) launch operation contracts utilizing a combination of contractor/government-owned facilities and equipment. However, NASA remained ultimately responsible and accountable for mission success.

ELV Management at Glenn Research Center, Goddard Space Flight Center, and Langley Research Center

Management and direction for these ELV programs were conducted at the Goddard Space Flight Center (GSFC) for the Delta vehicle, Glenn (formerly Lewis) Research Center (GRC) for the Atlas Centaur vehicle, and Langley Research Center (LaRC) for the Scout vehicle. Each Center had a project office staffed with highly experienced personnel supported by Center institutional organizations. Discipline expertise (propulsion, avionics, software, guidance, navigation and control, structures, parts, etc.) was available and often called upon to assist in mission assurance decisions. The vehicle project offices were typically staffed with discipline expertise with many years of experience. It was not uncommon to find government program personnel with equal or greater knowledge of the vehicle and its systems/subsystems than the contractors.

Created in 1959, the Delta Project, later renamed the Office of Launch Services (OLS) Project, was responsible for the design, development, and launch of the original Delta rocket. It is important to note that both LaRC and GRC employed similar ELV management approaches. With the introduction of the Commercial Space Launch Act Amendments, the U.S. Government was directed to procure commercial expendable launch services to the maximum extent possible. It was with this shift to commercialization that the Delta Project became the OLS Project. The OLS Project team possessed strong technical and programmatic skills spanning all core launch vehicle sub-system disciplines, spacecraft-to-launch vehicle integration, contract management, budget management, and overall program management. The mission of the OLS Project was the acquisition and management of high-quality and reliable small and medium class-based commercial launch services for use in the delivery of NASA or NASA-sponsored primary and secondary scientific payloads into orbit.

In the 1990's GRC was responsible for the overall management of commercial launch services for intermediate and large ELV's (Atlas Centaur/Commercial Titan III) for NASA and other government payloads. In the same time period, GSFC was responsible for the Delta and Pegasus launch vehicles. These roles ended on October 1, 1998, when GRC and GSFC responsibilities were transferred to KSC. GRC continues to support the industry by developing and testing new launch vehicle technologies and hardware through various cooperative programs.

General NASA ELV Contract Oversight Approach Prior to 1989

NASA civil servant and contractor personnel resident at the launch vehicle production facilities typically had extensive experience and knowledge of the vehicle, its systems, and contractor personnel and their capabilities. Resident personnel developed detailed knowledge of and actively participated in vehicle/system/subsystem design decisions, material review board (MRB) approvals, vehicle production reviews and tests, preship approvals, etc. Consequently, resident personnel gained insight sufficient to provide direction to the contractor that extended from parts level decisions to the decision to ship to the launch site Thus, resident personnel were the onsite "eyes and ears" for the project office, keeping them informed and making timely decisions on their behalf. The government/contractor team functioned much like an integrated product development team (IPDT) focusing on the ultimate goal of mission success.

Transition to KSC

In 1995 NASA conducted an Agency-wide zero based review (ZBR) to reassess all NASA HQ/Center roles and responsibilities. One result of this review was the decision to transition ELV management from multiple Centers to a single Center. The Agency determined that ELV acquisition and management belonged under the KSC operational launch center mission and the appropriate transition planning was begun.

In January of 1998 a transition plan that established KSC as the lead Center for acquisition and management of ELV launch services was signed by the Director of KSC and the Associate Administrator for Space Flight. The plan identified specific lead and performing Center roles and responsibilities. This included an implementation schedule for a staged transfer of intermediate expendable launch vehicle (IELV) launch services from GRC and medium, medium-lite, small, and ultra-lite class launch services from GSFC.

An important part of this transition involved the creation of strategic partnerships to take full advantage of the existing expertise at GSFC (Orbital Launch Services and Office of Flight Assurance), the Marshall Space Flight Center (Upper-Stages Project Office), and GRC (Launch Vehicle Project Office). The support and expertise embodied in these strategic partnerships include such critical mission assurance functions as independent review and assessment, mission integration, engineering analysis, and anomaly resolution.

Subsequent to January 1998, the transition proceeded on a mission-by-mission basis with KSC assuming all contract management and program authority effective October 1, 1998.

HQ ELV Requirements Office

The ELV Requirements Office in the Office of Space Flight (OSF) develops top level ELV acquisition and management policy and establishes overall manifest requirements.

1.2.4 Current KSC ELV Program

Objectives

The KSC ELV Program has established a set of top-level objectives in four primary areas: 1) customer requirements; 2) internal business processes; 3) learning and growth; and 4) financial. An expansion of these objectives is provided as follows:

Customer Requirements
- provide launch services to spacecraft customers anytime, anywhere
- reduce launch services cycle time
- continuously assess and improve customer satisfaction

Internal Business Processes
- develop, refine, enhance business processes
- partner with industry, academia, other NASA Centers, and other government agencies to lower risk and reduce cost

Learning and Growth
- develop and maintain expertise for acquisition and management of launch services
- develop a team environment which fosters learning
- reduce financial burden to the customer
- maintain project schedule and meet cost targets

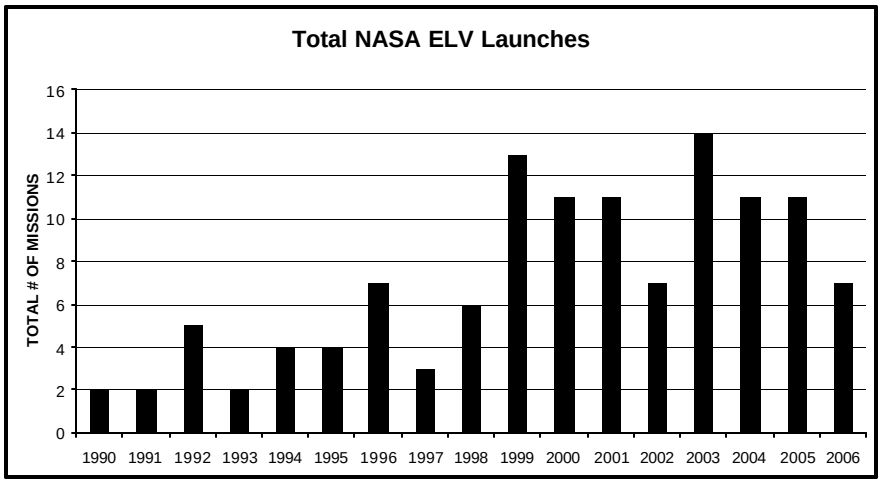
Manifest/Work Content

Within the context of the above stated objectives, the ELV Program faces a considerable challenge over the next several years. This is based on an increased launch rate, many launches taking place at Vandenberg AFB (imposing additional travel burden) and the requirement to manage launches from new, remotely located launch sites (Kodiak and Kwajalein Islands. Figures 1.2 and 1.3 show ELV total launch rate and total launches by site.

Figure 1.2

NASA ELV Total Launch Rate

EXPENDABLE LAUNCH VEHICLES



YEAR	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	TOTAL
NASA ELV Launches	2	2	5	2	4	4	7	3	6	13	11	11	7	14	11	11	7	120

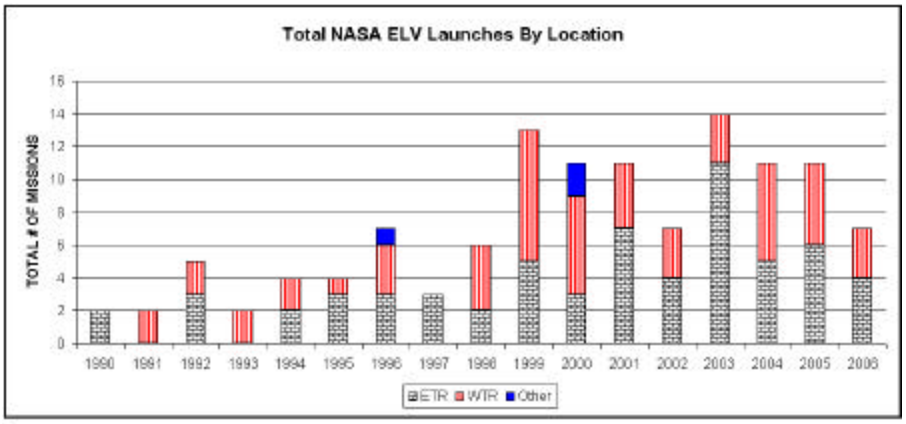
Based on 6/4/99 Flight Planning Board

Updated 7/21/99

Figure 1.3

NASA ELV Total Launches by Launch Site

EXPENDABLE LAUNCH VEHICLES

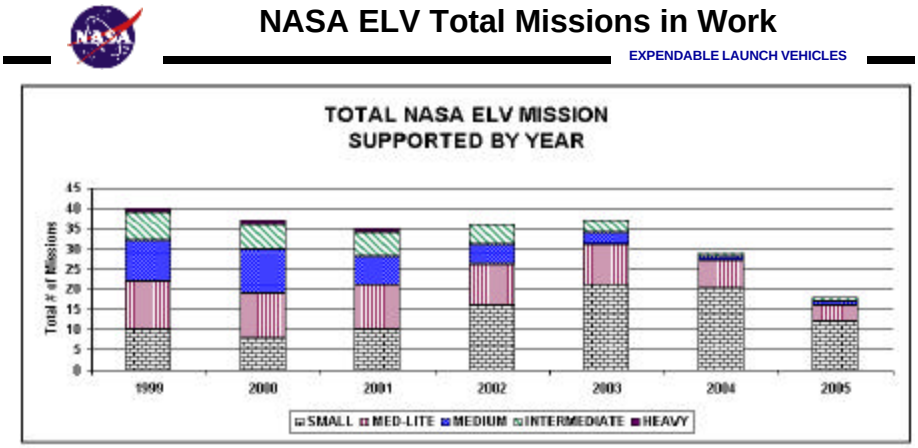


NUMBER	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	TOTAL
ETR	2	0	3	0	2	3	3	3	2	5	3	7	4	11	5	6	4	63
WTR	0	2	2	2	2	1	3	0	4	8	6	4	3	3	6	5	3	54
Other	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	3
TOTAL	2	2	5	2	4	4	7	3	6	13	11	11	7	14	11	11	7	120

Based on 6/4/99 Flight Planning Board

Updated 7/21/99

Figure 1.4



CLASS	1999	2000	2001	2002	2003	2004	2005
SMALL	10	8	10	16	21	20	12
MED-LITE	12	11	11	10	10	7	4
MEDIUM	10	11	7	6	3	1	1
INTERMEDIATE	7	6	6	5	3	1	1
HEAVY	1	1	1	0	0	0	0
TOTAL	40	37	35	36	37	29	18

Based on 6/4/99 Flight Planning Board *Updated 7/21/99*

In addition to supporting a relatively high number of launches in 1999 and 2000, the ELV Program Office must also provide ongoing engineering and SMA support for future ELV missions. This is expected to be 40 and 37 missions in 1999 and 2000 respectively as shown in figure 1.4.

Staffing

Staffing is a critical issue, particularly in view of the increasing workload described in the previous section. Baselined in May 1998, the ELV and Payload Carrier Programs Office had a staff of approximately 213. This total was apportioned among the ELV Program Office (124) and the Payload Carrier Program Office (89).

The ELV Program Office staffing provided: Management (9), Engineering Services (44), Mission Integration (23), Telemetry and Communication Services (12), Program Integration and Contract Technical Management (11), SMA (11), Procurement (8) and Comptroller (6).

The May 1998 baseline was developed to support a sustained launch rate of approximately six to eight launches per year with surge capability (overtime/comp-time) up to ten launches per year for brief periods. The current ELV manifest has a sustained launch rate of approximately 12 launches per year with peaks up to 17 launches. As a result, the ELV staffing requirements for the ELV Program Office have grown to 159 full time equivalents (FTE's), primarily in the Engineering Services and Mission Integration functions. The following tables provide a comparison between the number of individuals currently involved in assurance related activities with the number of individuals

performing similar tasks at GSFC and GRC prior to transition of ELV program management to KSC.

KSC ELV Assurance Related Staffing	Current
Civil Servants (CS) Engineering and Integration Mgmt	4
CS Engineering	51
CS Mission Integration	32
CS SMA	13
ELV Assurance Total Civil Servants	100
Contractors (Assurance Area)	39
Total ELV Assurance Personnel	**139**

ELV Assurance Personnel Prior to Transition		
	GSFC 1997	**GRC 1995**
Civil Servant Engineering	51	82
Contractor Engineers (incl. SMA)	29	45
Civil Servant SMA	5	6
ELV Assurance Total	85	133
Total ELV Assurance Personnel = 218		

Notwithstanding the staffing increases a number of key positions remain vacant. The most significant vacancies are in the KSC ELV Program Office, ELV Launch Services Directorate, and the Mission Integration and Customer Division. In addition to the vacant positions, there are concerns regarding the loss of experience base and the need for maintaining (or re-establishing) an appropriate workforce skill mix.

Placing the staffing issue in historical perspective, at the time when the ELV program responsibilities were transitioned to KSC, GSFC and GRC had a combined staff of approximately 220 ELV-experienced personnel devoted to providing launch service support for the NASA ELV programs. Of the existing KSC core staff, less than 10 percent of the previous approximate 220 ELV Center staff migrated to KSC.

1.3 KSC ELV and SMA Organizations

The organization and management structures are provided in the figures 1.5 and 1.6.

Figure 1.5

44 4

ASSOCIATE DIRECTOR FOR ELV, SUPPLIER QUALITY & INSTITUTIONAL

OTTO, GLENN Associate Director 867-3392 HQ 3517
Vacant Deputy Director HQ 3517
Vacant Secretary 867-3392 HQ 3517
LES MCGONIGAL Range Safety Manager 867-3163HQ
SANDY DUNFEE Mgt. Support Asst. HQ 3517
RUTHA WILLIAMS Mgt. Support Asst. 853-7991 CCAFS E&O

11

ELV FLIGHT ASSURANCE DIVISION

Staubus, Calvert Chief CCAFS E&O

MEEKS, SAM
KING, ROYSTAN
WITTER, ROBYN

HAMMOND, ROBERT QA Lead
WALKER, DIANE VAFB QA
BURNS, LINDA
GONZALEZ, JOSE
LELAND, LEE
LABIAK, ROBERT
NOONAN, EDWARD
ROEDER, JOE

NEWSOME, DOUG VAFB SAFETY

S&MA SUPPORT CONTRACTOR

ARRIGO, TONY (UNISYS, Chandler, Az)
AVILLAR, FRANK (SAIC, KSC)
HARRISON, WILLIAMS (SAIC, Denver, Co)
Vacant (UNISYS, Pueblo, Co)
STONE, RANDY (UNISYS, Hunt. Beach, Ca)
BARNA, FRANK (SMI, VAFB)
WHITE, DALLAS (SMI, VAFB)
BOLTEN, HERB (SMI, VAFB)

19

SUPPLER QUALITY DIVISION

SMITH, TERRY Chief 867-1419 HQ 3513
VARGAS, K. Secretary

BAILEY, JUD
COFFMAN, STEVE
DEANE, ED
GRISSOM, KEN
SWANSON, JAMES
TALLEY, CHARLES

BEST, RON NSLD
YOUNG, JAMES NSLD

ARMSTRONG, BOB LA
BAILEY, MOMTY CT
BOLEN, DENNIS CA
HILL, RAY CA
HYDE, KEN AL
MACK, ANDRE CT
MACRI, GEORGE IL
ROSS, TIM CO
WILDER, RICK AZ

10

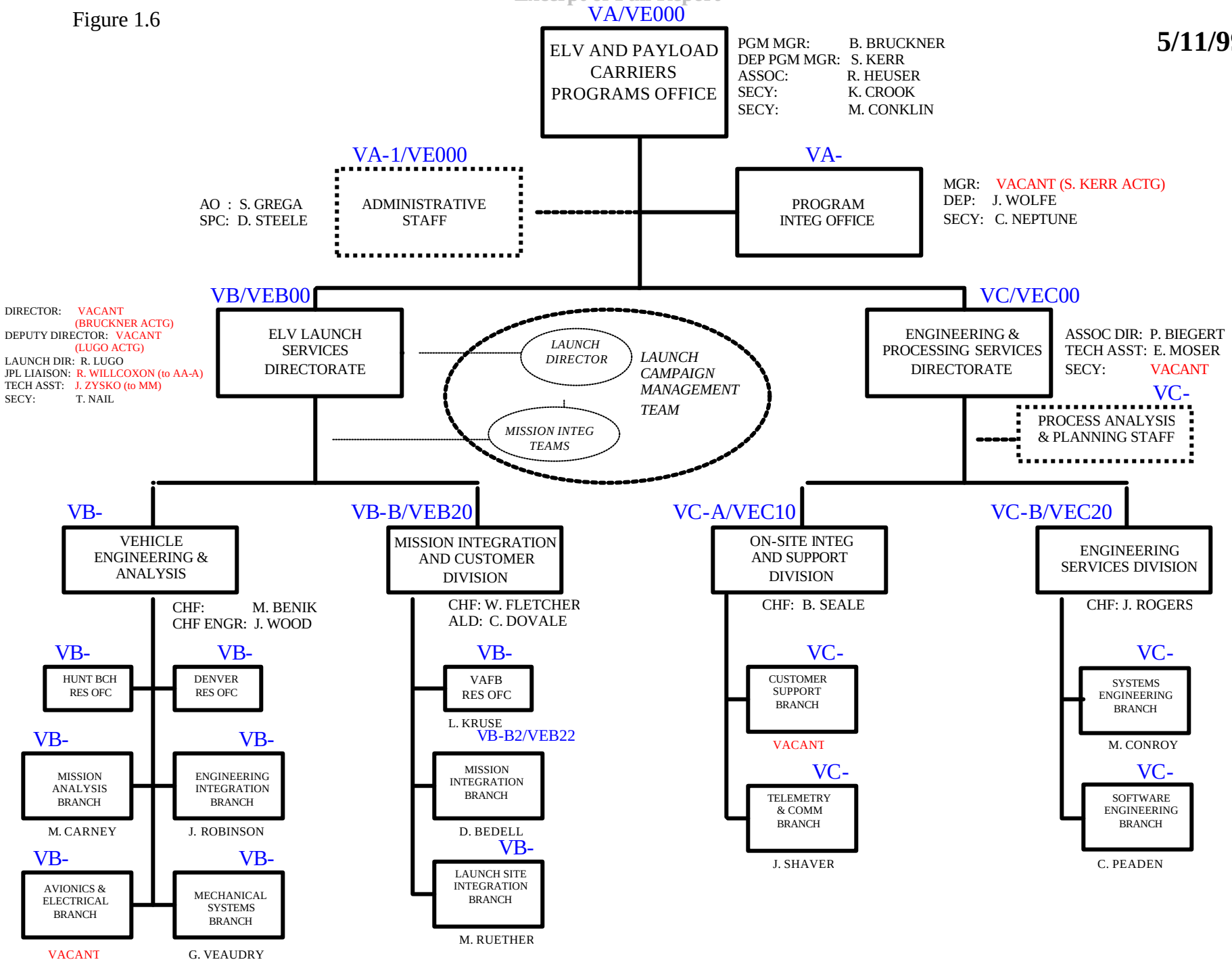
INSTITUTIONAL SAFETY D IVISION

GOODIN, RONNIE Chief 867-4493 HQ

DWYER, TOM
ENSIGN, CHARLES
FACEMIRE, DAVID
MEEKER, RON
RIDDLE, WILLIAM
SWIHART, PHILLIP
TURNER, ROBERT
VYCITAL, DON
WILLIAMSON, TIM

Figure 1.6

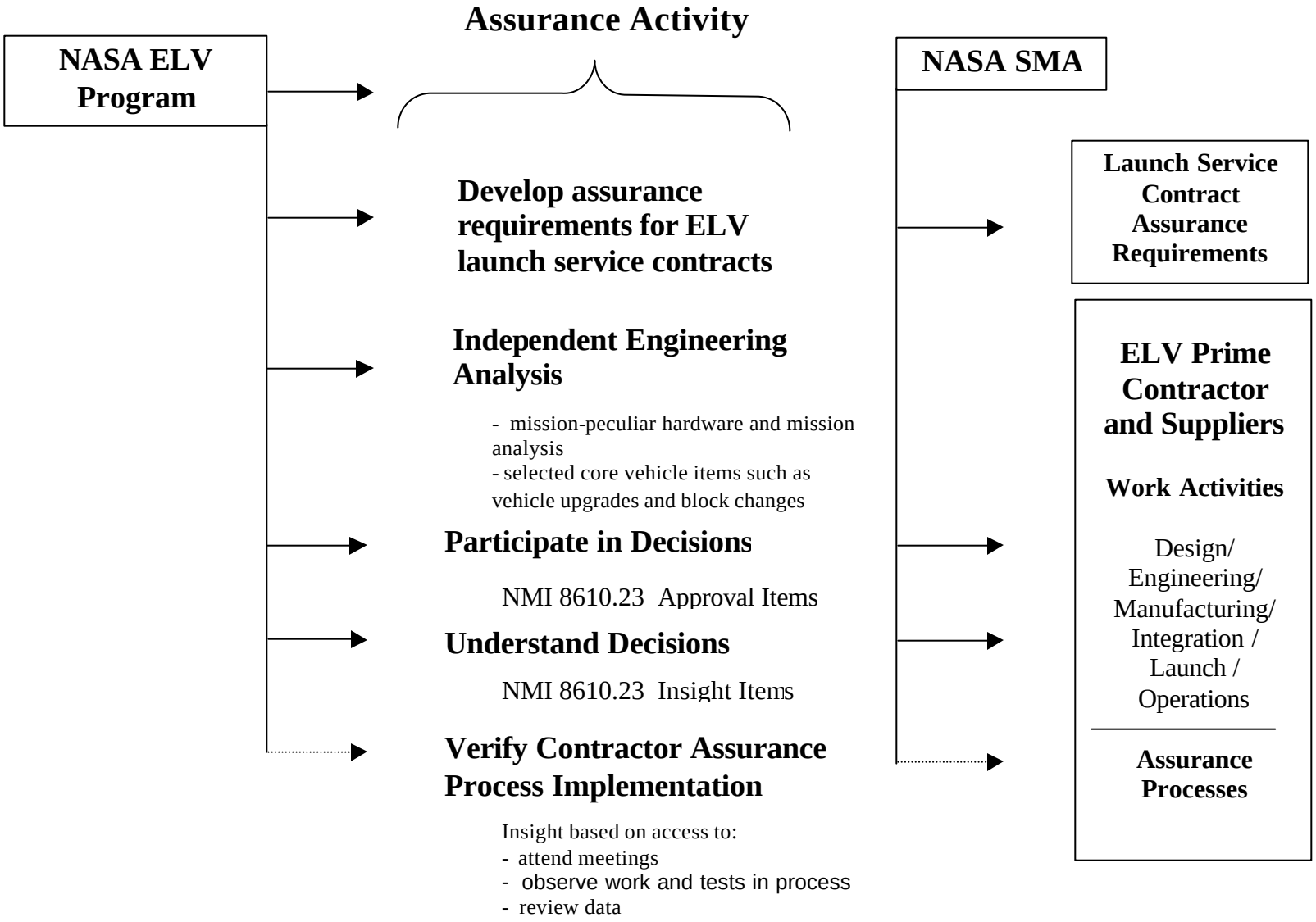
5/11/99



1.4 ELV Top-Level Assurance Functions

The organizations described in the previous sections are chartered to provide a basic critical set of ELV mission assurance activities which typically span the program development life-cycle. They begin with assuring that appropriate mission assurance requirements are established for the various launch service contracts and extend through the conduct of independent engineering analyses, participation (approval or insight per NMI 8610.23) in key program development decisions, and onsite or in-plant verification that prime contractor and supplier mission assurance processes are adequately implemented. These top-level assurance activities are summarized in figure 1.7.

Figure 1.7 NASA ELV Assurance Activities Top Level Functions



2.0 ELV Assurance Processes

2.1 ELV Assurance Process Mapping

Based on data and information gathered during the Discovery phase of the assessment, the review team constructed a high level ELV assurance process map (figure 2.1) to assist in understanding the complex management and documentation structure that supports the assurance functions summarized in figure 1.7 of the previous section.

Figure 2.1 contains heavy arrows (assurance vectors) which represent the delivery or implementation of assurance activities. Table 2.1 provides a key to assist in understanding the who, the how, and the what associated with each arrow. The complexity of figure 2.1 reflects the current (in transition) status of ELV program management relationships.

The assurance functions (the what's) are addressed in greater detail in appendix A which tracks the assurance model described in section 1.0, and provides an expanded discussion of each element.

Figure 2.1 Top-Level ELV Assurance Process Map "How & Who"

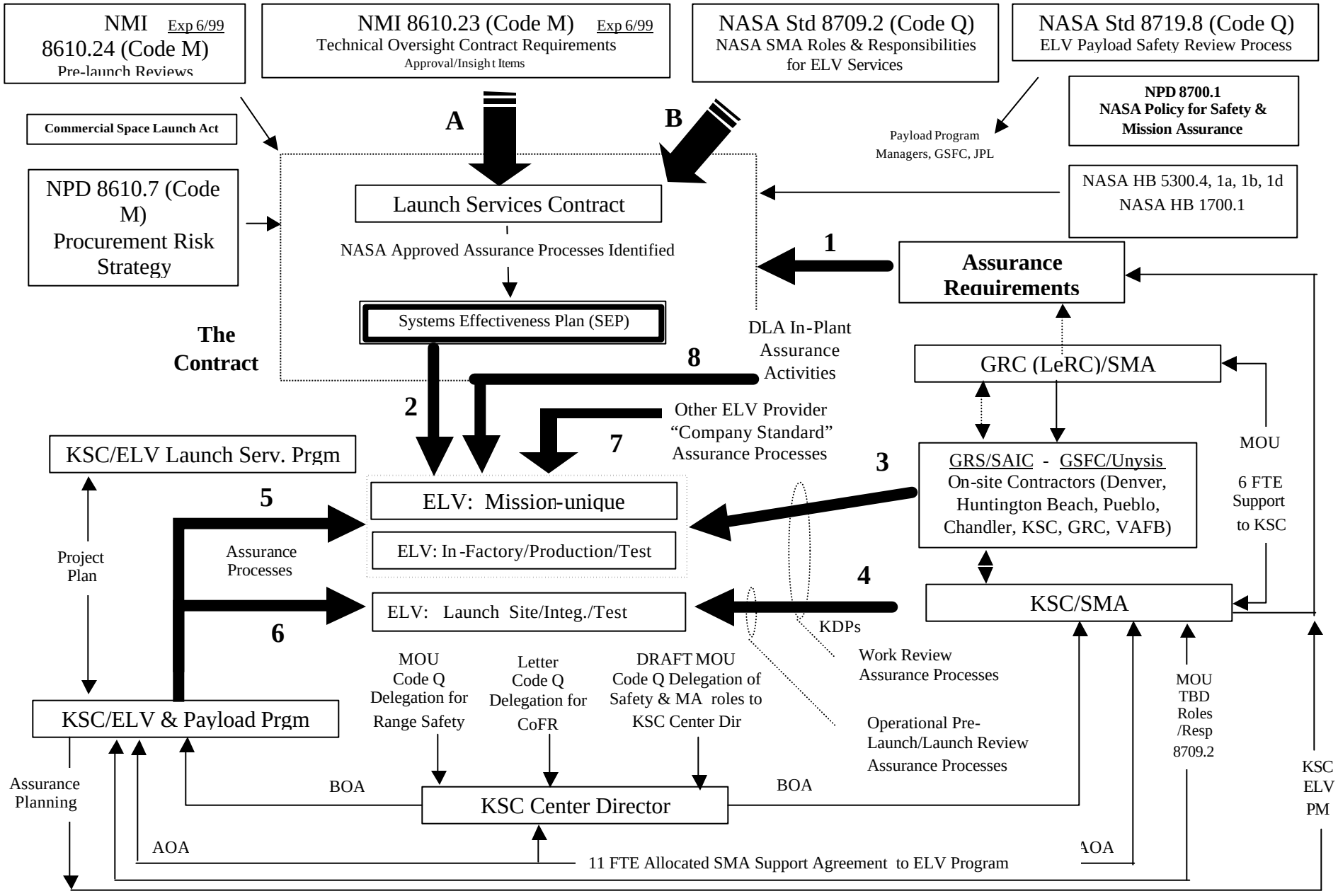


Table 2.1 Assurance Map – Description

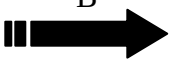
Assurance Vector	Who/Where (organization)	How	What (Assurance Function)
A 	NASA Office of Space Flight	Publication of NASA policy directives	NASA HQ/OSF policy document defining assurance provisions to be incorporated in ELV launch service contracts
B 	NASA Office of Safety and Mission Assurance	Publication of NASA policy directives	NASA HQ/SMA policy document defining assurance activities to be implemented in connection with ELV launch service contracts
1 	Representatives from the ELV Program Office and the SMA organization	Participation in Acquisition Source Evaluation Board Activity	Assurance Requirements Planning
2 	Contractor	Contract Deliverable	Contractually binding assurance requirements which the contractor develops and submits to NASA as a Contract Data Requirements List (CDRL). May be titled Systems Effectiveness Plan, Quality Plan, or some other contract appendix or attachment.
3 	In-the-factory NASA SMA Flight Assurance Managers (FAM's). Contractors located at Denver, Huntington Beach, and Chandler. Plans are to fill a vacant position at Pueblo.	NASA factory-based FAM's are currently supported by a complex network of MOA's, contracts, and resource transfers from KSC to GRC or GSFC.	Implementers of flight assurance functions: 1) participating in engineering decisions without approval authority; 2) understanding how engineering decisions are made. Maintain insight on production/manufacturing status and issues. Review nonconformance records. Manage or coordinate DCMC quality assurance support activities in the factory (see Arrow #8).

Table 2.1 (continued)

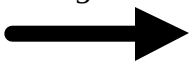
Assurance Vector	Who /Where (organization)	How	What (Assurance Function)
4 	KSC Safety and Mission Assurance Director	Participate in launch readiness reviews and, based on the data gathered below, provide the SMA position on launch readiness.	The ultimate KSC SMA assurance function is to gather the information and understanding necessary to support the CoFR.
	Flight Assurance Managers	Participate in Acceptance Reviews, Program Reviews, ERB's, MRR, LRR, FRR, launch countdown, etc. KDP's in work to document flight assurance processes	
	Quality Assurance Specialists	Surveillance of contractor work activities at the launch site. Participate in pathfinder activities and reviews. KDP's that document quality assurance processes	
5 	In-factory resident office staff. Individuals are located at Denver, Huntington Beach, Pueblo, and Chandler.	Participate in engineering and test and verification activities with approval authority for NASA mission-unique hardware and software. Residents maintain awareness of the basis for core vehicle engineering decisions. Offices are composed of NASA civil servants and contractor support staff.	In support and under the direction of KSC ELV Program Office, provide engineering oversight and monitoring of ELV manufacturing and production activity.

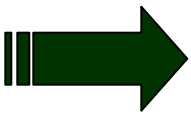
Table 2.1 (continued)

Assurance Vector	Who /Where (organization)	How	What (Assurance Function)
6 	KSC ELV Program Office - Engineering - Mission Integration	KSC-based engineering and mission integration personnel participate and manage mission-unique hardware and software design, verification, and test activities. The same staff provides an oversight engineering management role for core vehicle hardware and software. Key work processes include the Engineering Review Board and the Mission Integration Team(s).	Exercises ultimate responsibility for ELV mission success.

2.2 Observations, Findings, and Recommendations

2.2.1 ELV Management Assurance Processes – A Change of State

The following table describes key programmatic attributes before and after ELV management transition from GSFC/GRC to KSC.

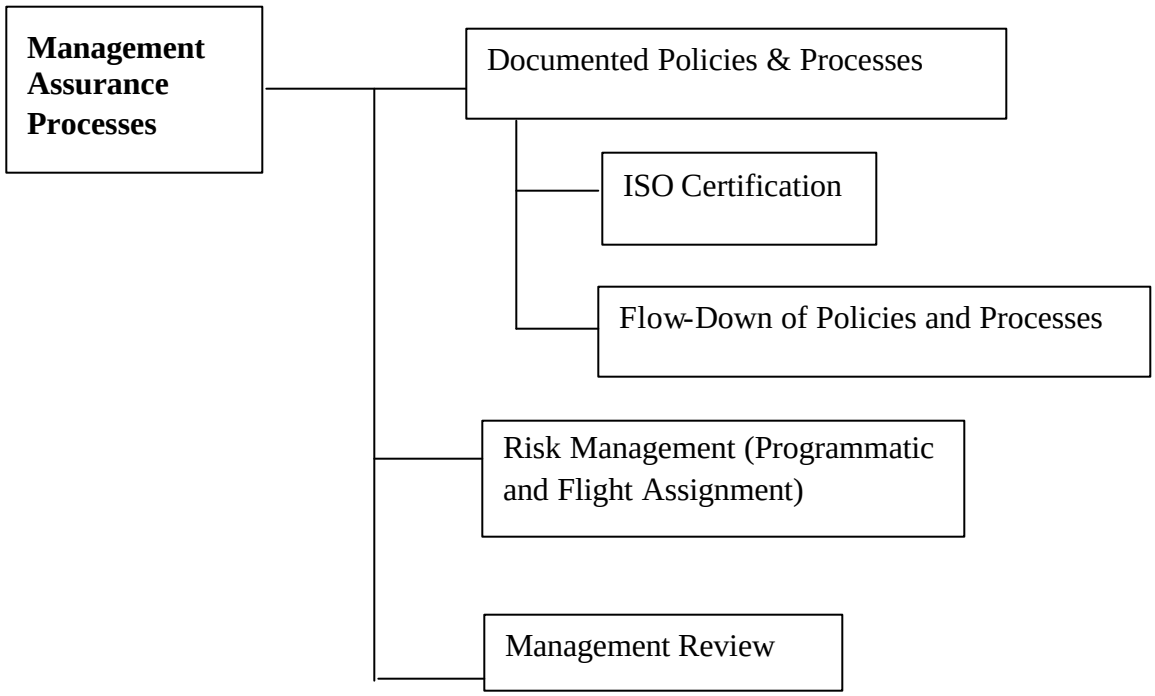
Condition A		Condition B
ELV managed at GSFC and GRC with ~220 FTE involved in assurance activities (contractors & civil servants)		Managed at KSC with approximately 139 FTE involved in assurance activities (contractors & civil servants)
Many employees with high levels (30+ years) of ELV experience – program management and design center culture	**ELV Transition**	10 to 15 years of aerospace engineering or management experience. Limited or no ELV experience – primarily launch and operations center culture
Extensive systems-level knowledge/detailed component or box-level knowledge of the vehicle		General systems-level knowledge but little or no knowledge at the box level of the vehicle
36 SMA flight assurance and quality assurance people (supported by institutional engineering organizations)	**Pre-1998 to Present**	25 flight assurance and quality assurance personnel (civil servants and contractors)
FAR Part 15 Procurement: Mission assurance requirements written into solicitation and included in contract.		FAR Part 12 Procurement (Commercial Item), tailoring and waivers needed to add specific assurance requirements and audit authority.
Mature set of launch vehicles with selective upgrades	***TRENDS***	Increasing number of launch vehicles (new and modified) to qualify and understand.
20 flights in-flow at any one time		35 to 40 flights in-flow at any one time
Three operational launch sites (KSC/VAFB/Wallops)		Five operational launch sites (KSC/VAFB/Kodiak/Kwajalein/Wallops)
Four to seven launches per year		10 to 15 launches per year
Approximately 98% NASA success rate over last 47 launches (OSF/Code MV presentation Aug. 10, 1999)		**?** **success rate … to be determined**

We are still seeing the results of condition A. We are moving toward condition B. Will we be able to maintain the launch success rate given the significant changes in ELV management?

A.1 Management Assurance Processes

Introduction

A documented top level management commitment to mission assurance and risk management is a necessary first step in establishing management assurance processes, policies, procedures, and documented requirements. Other key concepts include development of an assurance management strategy and implementation of assurance plans including a formal risk management plan. Management risk control concepts include audits to verify program and contractor assurance process implementation, assurance control boards, independent assessment, and formal management assurance reviews. Complex risk management issues invariably benefit from an informed and knowledgeable second opinion. Independent assessments are also applicable to design, engineering, manufacturing, and operational activities.



Documented Assurance Policies and Processes

The NASA ELV management assurance processes include Headquarters policy directives, letters of delegation, memoranda of understanding, and NASA standards as outlined below. Each of these documents defines certain processes and activities designed to assist in maintaining safety, managing risk, and achieving a higher likelihood of mission success.

Office of Space Flight

NMI 8610.24, "NASA Pre-launch Review Process" - This Instruction establishes the ELV prelaunch review process necessary to assess and certify the readiness for launch of the launch vehicle including separately provided upper stages and supporting launch services provided by commercial companies or by the DoD.

NMI 8610.23, "NASA Technical Oversight Contract Requirements" – This instruction establishes NASA's policy with regard to requirements for NASA to use ELV launch services provided by the private sector whenever available. NASA's accountability for success of its missions launched with private sector ELV launch services remains unchanged. Greater day-to-day oversight and insight responsibilities have shifted to the contractor. However NASA retains the responsibility and authority to direct technical changes it deems necessary.

NPD 8610.7, "NASA Procurement Risk Strategy" – This document establishes NASA policy with regards to requirements for NASA that state launch services acquired for deployment of NASA-owned, NASA-sponsored payloads must take advantage of all reasonable sources of U.S. commercial launch services, and at the same time, ensure that taxpayer-funded spacecraft are not thereby exposed to excessive risk. NASA launch services acquisition strategy balances mission risk with launch vehicle demonstrated flight history and maturity.

Office of Safety and Mission Assurance

NASA STD 8709.2, "NASA Safety and Mission Assurance Roles and Responsibilities for ELV Services" – This document defines the NASA Safety and Mission Assurance roles and responsibilities as they apply to the various commercial launch service procurement methodologies. The document addresses the NASA SMA functions required for each mission phase from procurement through design, production, launch vehicle integration, spacecraft integration, system test, pre-launch operations, launch operations, post launch activities, and mishap investigations.

NASA STD 8719.8, "NASA ELV Payload Safety Review Process Standard" – This document addresses the tasks, responsibilities, safety data package submittals, safety reviews/meetings, and schedules/milestones associated with the ELV payload safety review process. The safety review process for generic launch vehicle systems is outside the scope of this document and is defined by the applicable approving authority safety requirements document. The involvement of NASA Headquarters and NASA Field

Installations is defined in NHB 1700.1, "NASA Safety Policy and Requirements Document." Payload safety design requirements are not covered in this document nor are environmental, biological, health physics, and flight safety approvals.

ISO 9001 Certification

NASA HQ/OSF - On June 2, 1999, NASA Headquarters was approved for ISO 9001 certification from an internationally recognized registrar, Det Norske Veritas (DNV), of Oslo, Norway, and Houston, Texas.

DNV conducted an audit of the NASA Headquarters quality system on May 21, 1999, and recommended Headquarters for ISO 9001 certification. The scope of the certification includes the Strategic Enterprises - Scientific Research, Space Exploration, and Technology Development and Transfer missions. OSF is included in this certification. Within OSF is the ISO certified ELV Manifest Process. This process is documented in HOWI8682-M012. The purpose of this process is to describe the steps that lead to the development of the manifest for NASA missions utilizing ELV's.

NASA HQ/OSMA - ISO 9001 certification of NASA Headquarters currently includes only the first of a two-phase effort. Phase II of HQ ISO 9001 implementation was recently approved by the Associate Deputy Administrator. In Phase II, all Functional/Staff Offices (FSO's), including OSMA, will be included in the scope, and a reassessment performed by DNV in May 2000. With the completion of Phase II, all Headquarters offices will be within the scope of HQ ISO 9001 certification.

Contractors - Boeing Delta facilities at Huntington Beach and Pueblo are certified to ISO 9001. The certifying agent is Det Norske Veritas (DNV).

LMA, Littleton, CO, was certified on December 13, 1996, by British Standards Institute (BMI), Inc., and NASA was involved in the ISO 9001 internal audits.

OSC, Chandler, AZ, was certified on July 8, 1998, by BMI, Inc., and NASA was involved in the ISO 9001 internal audits.

Coleman Aerospace, Orlando, FL, was certified on September 29, 1998, by NSF International Strategic Registration. NASA conducted a second party audit concurrent to the third party certification by NSF.

Flow-Down of Policies and Processes

KSC ELV Program - KSC employs a system of documentation developed to achieve compliance with the requirements of ISO 9001. These documents are referred to as Kennedy Documented Procedures (KDP's). The following KDP's, representing the portion that apply to the KSC ELV Program Office, were included within the scope of the initial ISO 9001 certification completed at KSC on May 15, 1998.

KDP-P-1099, "Expendable Launch Vehicle (ELV) Launch Management"
KDP-P-1067, "Expendable Launch Vehicle (ELV) Insight and Approval"
KDP-P-1081, "Ground Operations Review (GOR)"

KSC/SMA - A number of high-level SMA KDP's, applicable to the ELV program, were included within the scope of the initial ISO 9001 certification completed at KSC on May 15, 1998. A partial listing is provided below:

KDP-P-2350, "Quality Assurance Program"
KDP-P-2351, "Quality System Assessment (QSA) Program"
KDP-P-2352, "Quality Assurance Surveillance Program"
KDP-P-2360, "Procurement Quality Division Documentation Review"
KDP-P-2361, "Procurement Quality Division Delegation of In-Plant Quality Assurance Functions"
KDP-P-2362, "Procurement Quality Division Delegated Agency Survey"
KDP-P-2363, "Procurement Quality Division Quality Audits"
KDP-P-2364, "Procurement Quality Division Pre-Award Survey"
KDP-P-2365, "Procurement Quality Division Contract Quality Assurance Management Files"

Risk Management - Programmatic

NASA Procedures and Guidelines (NPG)7120.5A requires that each: "program or project manager shall apply risk management principles as a decision making tool which enables programmatic and technical success. Program and project decisions shall be made on the basis of an orderly risk management effort, including the identification, assessment, mitigation, and disposition of risks throughout the program management process." The ELV Launch Services Project Status forum uses a "stoplight" tracking approach to identify and track program risks. This forum, as described below, serves to address schedule, cost, and technical risks.

Green - The Management Integration Team (MIT) is operating on a "business as usual" approach; on schedule to meet launch date, on budget, and with no technical issues that will delay launch or exceed the budget.

Yellow - MIT is working issues that require management awareness and may require management action, including technical/budget/contract issues that could effect the scheduled launch date if not resolved in a timely manner. Solution or a path to the solution has been identified.

Red - MIT is stopped and requires management action; issue(s) with no solution or mitigation plan identified. Issue(s) could result in high risk to launch success or seriously impact launch schedule or mission budget.

An example of the ELV Program risk tracking approach is provided in the following chart.

Attention Missions Stoplight

MISSION	PAGE(S)	OVERALL RATING	CORE VEHICLE	MISSION INTEG.	SCHEDULE	LAUNCH SITE	LAUNCH SERVICE
GOES-L	8-9	R	R	G	R	G	G
EOS-AM TERRA	10-11	R	R	G	R	G	G
TDRS-H	12-13	G	Y	G	G	G	G
EO1/SAC-C	14-15	R	G	R	R	G	G
VCL	16-17	G	Y	G	G	G	Y
GP-B	18-19	G	G	G	Y	G	G
MSP '01 Lander	20-21	G	G	Y	G	G	G
ICESAT/CATSAT	22-23	Y	G	G	G	G	G
GOES-N	24-25	R	R	G	G	G	G

Figure A-1

Risk Management - Flight Assignment

The NASA Commercial Launch Services Acquisition Review conducted in 1995 and 1996 and led by the NASA Headquarters Chief Engineer resulted in the formal establishment of a launch services risk mitigation policy (NPD 8610.7) for NASA-owned or NASA-sponsored payloads.

This policy directive defines the process to assess mission risk based on vehicle maturity and demonstrated flight history. Three categories of risk have been established:

- Category 1: Payloads deemed non-mission critical can be considered for flight on vehicles with no flight history.

- Category 2: Payloads deemed mission critical to Enterprise Strategic Plans and of moderate cost/complexity can be flown on NASA-acquired services with at least one demonstrated flight.

- Category 3: Payloads deemed mission critical with complex interface and higher cost can be flown on vehicles with demonstrated flight history, i.e., 14 or more consecutive successful flights.

NPD 8610.7 also requires that all NASA payloads will be flown on U.S. vehicles unless a Presidential waiver is granted. In addition, any international cooperative activities need to utilize a similar risk assessment process when foreign launch services are being considered. On-orbit services from qualified suppliers will be evaluated on a case-by-case basis with the OSF and the appropriate payload Enterprise.

Management Review Forums

The ELV program employs numerous management review forums within the general categories outlined below.

Periodic Senior Management Reviews -

- Quarterly Program Reviews
- Monthly Status Report (ELV and Spacecraft Project Report)
- Weekly Project Status (ELV Program Internal)

Engineering and Integration Reviews -

- Mission Integration Working Groups (MIWG's)
- Engineering Review Boards
- Preliminary/Critical Design Reviews
- In-plant Product Reviews
- Design Certification Reviews.
- Technical Interchange Meetings
- Engineering Review Boards
- Systems Requirements Reviews
- Preliminary Design Reviews
- Critical Design Reviews
- Vehicle Engineering Review Boards
- Vehicle Software Reviews
- Vehicle Test Readiness Reviews
- Vehicle Build Reviews

Launch Readiness Reviews - NPD 8610.24 requires the following readiness reviews prior to commitment to launch

- Spacecraft Mission Readiness Review
- KSC Center Director's Launch Vehicle Readiness Review
- Launch Readiness Review at launch minus one day (L-1)
- Final Poll for Launch

In addition, KSC conducts a Flight Readiness Review (approximately L-4) which is performed prior to the initiation of the final preparations for launch.

These reviews include the description of the launch service, mission-unique items, first flight items, and anomaly closures from previous missions. At the conclusion of these meetings a poll is conducted to assure that all parties responsible for mission success agree with proceeding to the next milestone.